DOCUMENT RESUME

ED 051 125 24 SP 005 013

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TITLE The Relationship Between Teacher Prophecy and Teacher Verbal Behavior and Their Effect upon Adult Student Achievement. Final Report.
INSTITUTION Florida State Univ., Tallahassee.
SPONS AGENCY Office of Education (DHEW), Washington, D.C. Bureau of Research.
BUREAU NO BR-0-D-012
PUB DATE Aug 70
GRANT OEG-4-70-0014(057)
NOTE 67p.

EDRS PRICE EDRS Price MF-$0.65 HC-$3.29
DESCRIPTORS *Classroom Communication, *Expectation, Nonverbal Communication, *Prediction, *Predictive Ability (Testing), *Teacher Attitudes, Verbal Communication

ABSTRACT

The study investigated the role of verbal cues in the communication of the self-fulfilling prophecy phenomenon. Specifically, the purpose was to determine the relationship between 1) teachers' verbal cues to students and teachers' prophecies, 2) teachers' verbal cues to students and student achievement, and 3) teachers' prophecies and student achievement. The reading subtest of the Wide Range Achievement Test was used to obtain pretest scores on students in an Adult Basic Education center. Four groups of experimental and control subjects with equal numbers of high and low scores were used, but the four randomly assigned teachers were led to expect high achievement only from the experimental subjects. The Flanders observation schedule was used to record verbal cue data over a period of 10 weeks. Results revealed significant relationships between prophecies and verbal cues and between prophecies and achievement, but not between verbal cues and achievement. The outcomes suggested that a teacher may use more indirect influence with students for whom he holds high expectations, thereby encouraging the student to participate and increasing his freedom of action. Suggestions for further research included a study designed to simultaneously examine and assess the relative inputs and effects of the several most probable modes of bias communication. (MBM)

BC 0-D-012
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ED051125

FINAL REPORT

Project No. 0-D-012

Grant No. OEG-4-70-0014(057)

THE RELATIONSHIP BETWEEN TEACHER PROPHECY AND TEACHER VERBAL BEHAVIOR AND THEIR EFFECT UPON ADULT STUDENT ACHIEVEMENT

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Tallahassee, Florida

August 1970

The research reported herein was performed pursuant to a grant with the Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

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TABLE OF CONTENTS

	Page
ACKNOWLEDGMENTS	4
FINAL REPORT ABSTRACT	5
Chapter	
I. INTRODUCTION	7
Statement of the Problem	
Significance of the Problem	
Review of Related Research	
Summary	
II. CONCEPTUAL FRAMEWORK	15
Broader Problem	
Specific Problem	
Basic Assumptions	
Definitions Basic to this Study	
Hypotheses	
III. INSTRUMENTATION	19
The Measurement of Interaction	
The Measurement of Achievement	
IV. METHODOLOGY	27
Selection of the Experimental Site	
Choosing Teachers and Assigning Individuals to Groups	
Achievement Expectations	
Training Technicians and Observers	
Collection of the Data	
Reduction of the Data	
V. DATA ANALYSES: PROCEDURES AND RESULTS . . .	35
Relationships Between Variables	
Summary	

Chapter

Page

VI. SUMMARY, CONCLUSIONS, AND IMPLICATIONS . . . 47

Summary of the Study
Conclusions
Implications

Appendices

A. DESCRIPTION OF TEACHERS AND STUDENTS 57

B. MEMORANDUM SENT TO TEACHERS 61

C. RELIABILITY COMPUTATION 65

BIBLIOGRAPHY 69

LIST OF TABLES

Table

1. Categories for Interaction Analysis 20

2. Sample Interaction Matrix 22

3. Distribution of Teachers and Subjects 33

4. Interaction Matrix for Control Subjects . . . 36

5. Interaction Matrix for Experimental Subjects . 37

6. Test for Overall Differences Between the Two Composite Interaction Matrices 38

7. Test for Differences Between Selected Submatrix Areas of the Two Composite Interaction Matrices 41

8. Correlations of Verbal Cues With Achievement Scores Adjusted for Initial Ability 43

9. Means of Posttest Achievement Scores Adjusted for Pretest Reading Ability 44

10. Analysis of Covariance of Pre- and Posttest Achievement Scores, with Pretest Reading Ability the Covariant 45

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ACKNOWLEDGMENTS

In addition to expressing sincere appreciation for the invaluable guidance and counsel given me by the members of my graduate committee--Professors Wayne L. Schroeder (Chairman), Charles M. Grigg, Irwin R. Jahns, and Maurice L. Litton--I should like to thank the many other persons and agencies whose kind assistance, guidance, and encouragement made this study and its completion possible.

Special thanks are extended to the Bureau of Research, U.S. Office of Education, for its direct financial support in the form of a small grant and for its permission to use the substantive portion of my dissertation as the main body of this report. In addition, the indirect financial assistance received from the Ford Foundation and Title I of the Higher Education Act during the developmental phase of the project is gratefully acknowledged.

Appreciation is extended to all personnel of the Florida State University Urban Research Center, and especially to Dr. Huey B. Long for the time and assistance he contributed to the study. I am also indebted to the Director of Adult Education, to several members of his ABE staff, and to the ABE teachers and participants of the southeastern United States county where the study was conducted, for their vital contributions to the project.

FINAL REPORT ABSTRACT

PURPOSE

The study was designed to investigate the role of verbal cues in the communication of the self-fulfilling prophecy phenomenon (the tendency of one person's prediction of another's behavior to somehow come true). Specifically, the purpose of the investigation was to determine the relationships between (1) teachers' verbal cues to students and teachers' prophecies, (2) teachers' verbal cues to students and student achievement; and (3) teachers' prophecies and student achievement.

PROCEDURES

Using the reading subtest of the Wide Range Achievement Test (WRAT), pretest scores were obtained on all potential subjects in an Adult Basic Education center located in a metropolitan area of the southeastern United States. These scores were used to select and balance four control subjects with four experimental subjects so that there were equal numbers of high scorers and low scorers in each of four groups. However, the four teachers who were randomly assigned to the groups were led to expect high achievement in reading from only the experimental subjects. Four trained observers used the Flanders observation schedule to record verbal cue data from teacher-student interactions in the tutorial-type settings over a period of ten weeks. Achievement data were derived from net gains in reading performance, adjusted for initial reading ability, between pre- and posttests on the WRAT.

RESULTS AND CONCLUSIONS

Statistical tests of the data revealed significant relationships between prophecies and verbal cues and between prophecies and achievement, but not between verbal cues and achievement. Conclusions were therefore drawn that: (1) a teacher's preconceived notions relative to the achievement potentials of his students will influence the types and rates of verbal interactions he has with the students; (2) the communication of the bias phenomenon cannot be explained on the basis of verbal cues alone; and (3) there is a direct

relationship between prophetic teachers' levels of expectations and levels of achievement attained by their students (which confirms findings of previous investigators).

IMPLICATIONS

The results generally supported the social psychological theory which holds that a person who senses asymmetry of orientation with another toward an attitude object which they both hold in common will attempt to establish co-orientation with the other person by influencing him, principally through the medium of communicative acts, toward his own orientation. In a similar manner, the findings generally supported the theoretical viewpoint that teachers control their own influence primarily through the medium of appropriate content-free statements during their spontaneous interactions with the students. Finally, the outcomes seemed to support the notion of the centrality of verbal and auditory cues in the network of concepts needed to construct the emerging theory of unintentional influence.

From a practical standpoint, the outcomes of the study augmented and supplemented previous evidence on self-fulfilling prophecies, inasmuch as unfounded teacher expectations led to improved intellectual performance in this study as in previous studies. Moreover, since the investigation was conducted in an environment where both students and teachers were adult members of the same minority ethnic group, the findings suggested that teachers may get more when they expect more, whether teaching children or adults, and irrespective of the color of the skins of either the teacher or his students. Finally, the outcomes suggested that a teacher may use more indirect influence with students for whom he holds high expectations, thereby (1) encouraging the student to participate and (2) increasing the student's freedom of action.

RECOMMENDATIONS FOR FURTHER RESEARCH

Suggestions for further research on the self-fulfilling prophecy phenomenon included that of a study designed to simultaneously examine and assess the relative inputs and effects of the several most probable modes of bias communication.

CHAPTER I

INTRODUCTION

Statement of the Problem

This study was designed to determine the relationships between: (1) teachers' verbal cues to students and teachers' prophecies; (2) teachers' verbal cues to students and student achievement; and, (3) teachers' prophecies and student achievement.

Significance of the Problem

It is generally recognized that one of the major objectives of teachers is to help students develop their intellectual capacities. Evidence is being compiled, however, which indicates that teachers could fail to reach this objective whrough the conveyance to students of negative attitudes that tend to impede rather than promote intellectual development.

In a recent study those students who were thought by their teachers to be bright made rapid academic progress; conversely, those students who were believed by their teachers to be dull performed poorly. Inasmuch as teachers' expectations toward students' potentials were unfounded, however, the experimenters attributed the differential performance of the two groups of students to the operation of a phenomenon known as the "self-fulfilling prophecy."[1]

According to Merton, the self-fulfilling prophecy is, "in the beginning, a false definition of the situation evoking a new behavior which makes the originally false conception come true."[2] Placed in a social context,

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[1]Robert Rosenthal and Lenore F. Jacobson, "Teacher Expectations for the Disadvantaged," Scientific American, CCVIII (April, 1968), 19-23.

[2]Robert K. Merton, Social Theory and Social Structure (New York: Free Press of Glencoe, 1957), p. 423.

Rosenthal and Jacobson say that the "essence of this concept is that one person's prediction of another person's behavior somehow comes to be realized."[1]

Seemingly, then, teachers may either promote or retard student progress through the effects of their preconceived notions (levels of expectations) relative to students' capabilities and limitations. In other words, there is evidence that effects of prophecies similar to those previously observed in a series of laboratory experiments with animals can also be observed in the realm of human interpersonal behavior.[2]

The discovery of the pervasiveness of the self-fulfilling prophecy phenomenon will probably intensify research efforts aimed at determining the manner in which prophecies are communicated. Rosenthal has suggested that a major portion of an adequate explanation of prophecy communication may stem from the investigation of prophets' verbal behaviors toward subjects.[3] Thus it was proposed that this study would have theoretical importance because of the contribution of its explanatory variable of prophecy communication--the differential effects of prophecies on teachers' verbal behaviors toward students.

If it can be learned how prophecies are communicated, teachers could then be trained to bring about dramatic improvement in the performance of their students without formal changes in their methods of teaching.[4] Therefore, it was further proposed that the data derived from this study on the relationship between teachers' verbal cues and student achievement would have practical implications.

In summary, previous theory and research on the effects of prophecies had either demonstrated, emphasized, or

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[1] Rosenthal and Jacobson, "Teacher Expectations," p. 19.

[2] Robert Rosenthal and Lenore F. Jacobson, Pygmalion in the Classroom: Teacher Expectation and Pupils' Intellectual Development (New York: Holt, Rinehart and Winston, Inc., 1968), p. 44.

[3] Robert Rosenthal, Experimenter Effects in Behavioral Research (New York: Appleton-Century-Crofts, 1966), p. 289.

[4] Rosenthal and Jacobson, "Teacher Expectations," p. 23.

suggested the importance of concepts central to this study. The concept of student achievement had been demonstrated to be related to the concept of the self-fulfilling prophecy. The concept of the self-fulfilling prophecy had been emphasized as being of paramount importance to the development of an adequate explanation of how one person's unfounded expectations can produce differential effects on others' performances. The concept of prophets' verbal behaviors had been suggested as a principal mode through which prophecies are communicated. Therefore, this author believed that a significant contribution could be made to both theory and practice by: (1) quantifying and comparing, in a carefully controlled situation where the self-fulfilling prophecy phenomenon was operational, teachers' verbal behaviors toward students for whom they held differential but unfounded expectations; and, (2) studying the effects of prophetic teachers' verbal behaviors on student achievement.

Review of Related Research

Prophecy Communication/Fulfillment

Visual cues

Visual cues seem to be important, though not always crucial to the conveyance of prophecies from experimenters or others to subjects.

The mystery of Clever Hans--the horse that learned to add, subtract, multiply, divide, spell, solve problems of musical harmony, and answer personal questions--was solved by studying his responses to visual cues unintentionally provided by questioners. Pfungst observed that Hans began hooftaps as people who questioned him leaned forward slightly to get a better view of the hoof; Hans quit tapping on another unintential cue from the questioners, who made very small head, eyebrow, or nostril movements as Hans approached the correct number of hooftaps. Moreover, Hans was found to be unable to answer questions that the questioner himself could not answer. Pfungst concluded, therefore, that the questioner did himself fulfill his own prophecy of Hans' amazing abilities by visually "telling" him the correct answers.[1]

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[1]Oskar Pfungst, Clever Hans (The Horse of Mr. von Osten): A Contribution to Experimental Animal and Human Psychology, trans. by Carl L. Rahn (New York: H. Holt & Co., 1911).

In a number of laboratory experiments involving rats, where experimenters' prophecies about their animals' behaviors were somehow fulfilled, it has generally been noted that visual cues could have played a part in the transmission of the experimenters' expectations to their animals. For example, it has been determined that those experimenters who were led to expect better performance described their behavior toward their animals as "more pleasant, friendly, enthusiastic, and less talkative than did experimenters who were led to expect lower performance from their animals.[1]

Another type visual cue that seemingly contributes to this process is the differential amounts of careful observation of subjects by experimenters or teachers. It has been found that animals believed by their experimenters to be brighter were watched more carefully by their experimenters.[2] On the basis of this laboratory finding, the investigators in a self-fulfilling prophecy experiment in schools surmised that teachers could have watched children who were designated as "academic spurters" more closely than they watched those children not so designated.[3]

Auditory cues

Equally or perhaps more important to the process of prophecy communication are auditory cues intentionally or unintentionally given to the subject.

Rosenthal and Fode found that the elimination of visual cues (a screen placed between experimenter and subject) reduced, but did not eliminate, the phenomenon of the self-fulfilling prophecy.[4] This finding suggests that both

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[1] Rosenthal and Jacobson, Pygmalion, pp. 35-59. Note that experimenters with greater expectancies reported that they were less talkative to their animals. The authors' comment on this was: "One wonders what was said to the animals by those experimenters who believed their rats to be inferior." (p. 39).

[2] Ibid., pp. 39-40.

[3] Ibid., p. 161.

[4] Robert Rosenthal and Kermit L. Fode, "Psychology of the Scientist: V. Three Experiments in Experimenter Bias," Psychological Reports, XII (April, 1963), 491-511.

visual and auditory cues are important in the transmittal of experimenter bias.

The importance of auditory cues was demonstrated even more conclusively by Adair and Epstein.[1] By tape-recording the experimenters' readings of standard instructions to subjects, they found that prophecies were still fulfilled in a manner not unlike that in earlier studies where "live" experimenters imparted instructions to subjects. It would appear, then, that self-fulfilling prophecies "may be brought about by the tone in which the prophet prophecies" while interacting with the subject.[2] More important perhaps, the results of this experiment seem to indicate that verbal cues alone could be sufficient to mediate the bias phenomenon. However, it should be noted that the findings in Adair and Epstein's experiment corroborated conclusions reached in other studies that "experimenters do not tell their subjects in words . . . what it is they expect from them."[3]

Other cues

Even a cursory examination of the literature on the self-fulfilling prophecy will reveal an extremely wide offering of explanations of how this phenomenon might operate. These explanations run the gamut of possible interrelationships: From ESP between experimenters and human subjects--to variations in experimenters' respiratory rates and body temperatures as the mode of communicating expectations to aquatic worms! While many of these observations are highly speculative and inconclusive, a few do appear to be instructive in relation to this study.

A case in point is the question of whether the number of physical contacts between experimenters or teachers and their subjects could provide expectancy cues. Ingraham and Harrington effectively discounted this as a means of

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[1] J. G. Adair and Joyce Epstein, "Verbal Cues in the Mediation of Experimenter Bias" (Paper read at Midwestern Psychological Association, Chicago, May, 1967), cited by Rosenthal and Jacobson, Pygmalion, pp. 28-29.

[2] Rosenthal and Jacobson, Pygmalion, p. 29.

[3] Rosenthal, Experimenter Effects, p. 281.

conveying biased expectations to <u>animals</u>.[1] Despite the fact that all experimenters in their study were instructed to give subjects equal handling time, superior performance was obtained among rats whose experimenters expected superior performance. However, the question of touch as a possible mode of communicating biases among <u>humans</u> is still unsettled, as indicated by Rosenthal and Jacobson's recent remark that a teacher's "tone of voice, facial expression, <u>touch</u> and posture may be the means by which . . . she communicates her expectations to the pupils."[2] (Underlining mine.)

Experimenter status has also been studied as a possible factor in the operation of experimenter expectancy effects. Using faculty members and graduate students as experimenters, Vikan-Kline was able to demonstrate that higher status experimenters (the faculty members) obtain data more in accord with their expectations than do lower status experimenters (the graduate students).[3] In a somewhat similar study, however, Lazlo found lower status experimenters to be more successful than higher status experimenters in this regard.[4] He used as experimenters only graduate students, some of whom he randomly designated higher status, while the others he let remain as "just students" in the eyes of the subjects. Thus it would seem that while the prophet's status might be important to the process of bias communication between humans, it has yet to be confirmed.

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[1]Larry H. Ingraham and Gordon M. Harrinton, "Psychology of the Scientist: XVI. Experience of E as a Variable in Reducing Experimenter Bias," <u>Psychological Reports</u>, XIX (October, 1966), 455-461.

[2]Rosenthal and Jacobson, "Teacher Expectations," p. 23.

[3]Linda L. Vikan-Kline, "The Effect of An Experimenter's Perceived Status on the Mediation of Experimenter Bias" (unpublished Master's thesis, University of North Dakota, 1962), cited by Rosenthal, <u>Experimenter Effects</u>, pp. 244-245.

[4]John Lazlo (unpublished study), cited by Rosenthal, <u>Experimenter Effects</u>, pp. 77-79, 244-245.

Interaction Analysis of Prophets' Verbal Behaviors

Interaction analyses in general

From a generalized standpoint the literature yields a dearth of studies in which systematic analyses of interaction have been used to assess the influence--either intentional or unintentional--of teachers' verbal behaviors on students. This apparently "limited state of the art" in the study of the interaction processes that actually take place between teachers and students has been commented on by Medley and Mitzel who remark that:

> Certainly there is no more obvious approach to research on teaching than direct observation of the behavior of teachers while they teach and pupils while they learn. Yet it is a rare study indeed that includes any formal observation at all. In a typical example of research on teaching, the research worker limits himself to the manipulation or study of antecedents and consequents of whatever happens in the classroom while the teaching itself is going on, but never once looks into the classroom to see how the teacher actually teaches or how the pupils actually learn.[1]

Interaction analyses involving prophets

The situation becomes even more acute as one attempts to find in the literature on the self-fulfilling prophecy evidence of the collection of on-the-scene data for use in analyzing prophets' verbal behaviors. In fact, a perusal of literature uncovered no previous attempt to systematically record and analyze the verbal behaviors of prophets toward subjects for whom they hold differing expectations.

Of course, prophets' verbal behaviors have been studied, as indicated in a previous section of this paper where prophet-subject interrelationships were reviewed. But it should be noted that these studies were based on

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[1]Donald M. Medley and Harold E. Mitzel, "Measuring Classroom Behavior by Systematic Observation," in Handbook of Research on Teaching, edited by N. M. Gage (Chicago: Rand, McNally & Co., 1963), p. 247.

ex post facto evidence. In general, then, the current situation on the analysis of prophets' verbal behaviors seems to be in keeping with Rosenthal and Jacobson's remark that:

> So far there is only a poor beginning to the development of a psychology of unintentional influence or communication and, so far, none of it is based on a study of teachers subtly influencing the intellectual behavior of their pupils.[1]

Summary

In summary, this experiment was designed to determine the relationship between teachers' verbal cues to students and teachers' prophecies; the relationship between teachers' verbal cues to students and student achievement; and the relationship between teachers' prophecies and student achievement.

It was proposed that this study would have theoretical and practical importance, inasmuch as it would provide information for the elaboration of the theory of prophecy communication and the subsequent development of teacher training programs aimed at maximizing the positive influence of teachers' prophecies relative to students' potentials.

Many studies had already been conducted on the self-fulfilling prophecy phenomenon, with emphasis on (1) establishing evidence of the effects of prophecies in a variety of experimental settings, and (2) determining the types of cues that prophets give subjects to facilitate the communication of prophecies. Of the factors "still in the running" in the ongoing research to narrow down the field to the most plausible set of explanations of prophecy communication, it appeared that verbal and auditory cues were among the most important. However, there was no evidence of a previous attempt to systematically record and analyze the verbal behaviors of prophets toward subjects for whom they held differing but unfounded expectations.

The present study was designed to supplement and augment knowledge of prophecy communication through a detailed analysis of teachers' communications to students for whom they held biased expectations. Moreover, this study was designed to determine whether or not teachers' verbal cues affected student achievement. Finally, data derived from this study was used to determine the relationship of teachers' prophecies to academic achievement.

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[1] Rosenthal and Jacobson, Pygmalion, p. 160.

CHAPTER II

CONCEPTUAL FRAMEWORK

Broader Problem

The broader problem with which this study was concerned was that teachers seemed to be able to make unfounded prophecies relative to their students' achievement potentials. These prophecies were then somehow conveyed to the students, and the students, in turn, tended to fulfill the prophecies.

Specific Problem

The specific problem with which this study was concerned has three parts, namely: (1) isolating teachers' verbal cues to students about whom they had made prophecies; (2) determining the relationship which existed between teachers' verbal cues and (a) levels of achievement attained by students to whom the cues were directed, and (b) expectations held by the teachers; and, (3) determining the relationship which existed between teachers' prophecies and student achievement.

Research findings cited in the previous chapter indicate that: (1) there is a relationship between teachers' prophecies and student achievement, and (2) teachers' prophecies may be at least partially conveyed to students through the medium of verbal cues. A portion of Newcomb's theory of communicative acts indicates that a person who senses asymmetry of orientation with another person toward an attitude object which they both hold in common will attempt to establish co-orientation with the other person by influencing him toward his own orientation.[1] Current theory on how teachers influence students suggests that a

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[1] Theodore Newcomb, "An Approach to the Study of Communicative Acts," Psychological Review, LX (September, 1953), 393-404.

teacher controls his own influence primarily by using appropriate content-free statements during spontaneous interaction with students.[1]

This study, by varying teachers' expectations for their students' achievement (so that they expected higher achievement from some students) attempted to isolate the communicative acts (verbal cues) they used with different students to establish or maintain teacher-student symmetry of orientation toward a common attitude object (achievement expectations). An attempt was then made to determine if verbal cues directed toward students (1) influenced net gains in achievement students attained or (2) were related to levels of expectations held by the teachers.

Basic Assumptions

1. Teachers generally expect relatively low academic achievement from disadvantaged students.

2. Students tend to fulfill teachers' prophecies.

3. The verbal behavior of an individual is an adequate sample of his total behavior.

4. A teacher's verbal statements can be generically categorized, quantified, and used to test hypotheses relative to his influence on students.

Definitions Basic to This Study

Differential Expectations

Differential expectations refer to the two broad levels of teachers' expectations, where they had been led to hold high expectations for the academic potentials of only a few of the students assigned to their respective group.

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[1] U.S. Office of Education, Teacher Influence, Pupil Attitudes, and Achievement, Final Report, Cooperative Research Project No. 397, USOE, by Ned A. Flanders (Washington, D.C.: Government Printing Office, 1960), p. 11; Ned A. Flanders, "Some Relationships among Teacher Influence, Pupil Attitudes, and Achievement," in Contemporary Research on Teacher Effectiveness, ed. by Bruce J. Biddle and William J. Ellena (New York: Holt, Rinehart and Winston, Inc., 1964), p. 198.

Self-fulfilling Prophecy

The self-fulfilling prophecy was operationalized through the implantation in the minds of teachers of differential expectations for their students' achievement.

Verbal Cues

The overarching verbal cue was the difference in total interaction teachers had with students for whom they held differential expectations. Specific verbal cues derived from the difference in the number of times teachers employed each of the following verbal categories or combination of verbal categories while interacting with students for whom they held differential expectations:

a. Accepting or enlarging upon students' expressed feelings.

b. Praising or encouraging students' actions or behaviors.

c. Accepting or using students' ideas.

d. Querying students.

e. Lecturing to students.

f. Using directions, commands, or orders to students.

g. Criticizing students.

h. Indirectly influencing students, or a combination of "a" through "d" above.

i. Directly influencing students, or a combination of "e" through "g" above.

The specific verbal cues either represented or were extrapolated from generic categories of teachers' content-free verbal statements which form the basis of interaction analysis--the "process of abstracting the intent of an act from the act itself."[1]

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[1]Flanders, Teacher Influence, . . ., Appendix F, p. 2.

Student Achievement

Student achievement was represented by the adjusted net gains in scores obtained by students between pre- and posttesting on the Wide Range Achievement Test.

Hypotheses

Stated in the null form, the hypotheses of this study were:

1. There is no significant relationship between teachers' expectations and their verbal cues to students.

2. There is no significant relationship between teachers' verbal cues and student achievement.

3. There is no significant relationship between teachers' expectations and student achievement.

CHAPTER III

INSTRUMENTATION

The Measurement of Interaction

In the field of education, one of the most widely used techniques for observing classroom climate is Flanders' "Interaction Analysis" schedule.[1] (See Table 1.)

It is obvious that Flanders' categories were designed specifically for use in recording classroom interactions.[2] According to Flanders, his "Interaction Analysis" was designed to provide accurate descriptions of teachers' behaviors, to provide a systematic record of spontaneous acts in the classroom, and to furnish a means of studying, in detail, the instructional process from a record of each small bit of interaction.[3]

The basic assumption of the Flanders system is that the "verbal behavior of an individual is an adequate sample of his total behavior."[4] It is therefore concerned with verbal behavior only, not just because of this assumption, but also because Flanders feels that verbal behavior can be measured more reliably than nonverbal behavior. In addition, Flanders states that: "Of the total complex called

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[1] Donald M. Medley and Harold E. Mitzel, "Measuring Classroom Behavior by Systematic Observation," in Handbook of Research on Teaching, ed. by N. L. Gage (Chicago: Rand McNally & Co., 1963), pp. 254-290.

[2] Ibid., p. 271.

[3] U.S. Office of Education, Teacher Influence, Pupil Attitudes, and Achievement, Cooperative Research Monograph No. 12, by Ned A. Flanders (Washington, D.C.: Government Printing Office, 1965), p. 35.

[4] Ibid., p. 5.

TABLE 1.--Categories for interaction analysis[a]

TEACHER TALK	INDIRECT INFLUENCE	1. *ACCEPTS FEELING: accepts and clarifies the feeling tone of the students in a nonthreatening manner. Feelings may be positive or negative. Predicting or recalling feelings are included. 2. *PRAISES OR ENCOURAGES: praises or encourages student action or behavior. Jokes that release tension, not at the expense of another individual, nodding head or saying, "um hm?" or "go on" are included. 3. *ACCEPTS OR USES IDEAS OF STUDENT: clarifying, building or developing ideas suggested by a student. As a teacher brings more of his own ideas into play, shift to category five. 4. *ASKS QUESTIONS: asking a question about content or procedure with the intent that a student answer.
	DIRECT INFLUENCE	5. *LECTURING: giving facts or opinions about content or procedure; expressing his own ideas, asking rhetorical questions. 6. *GIVING DIRECTIONS: directions, commands, or orders to which a student is expected to comply. 7. *CRITICIZING OR JUSTIFYING AUTHORITY: statements intended to change student behavior from nonacceptable to acceptable pattern; bawling someone out; stating why the teacher is doing what he is doing; extreme self-reference.
STUDENT TALK		8. *STUDENT TALK--RESPONSE: a student makes a predictable response to teacher. Teacher initiates the contact or solicits student statement and sets limits to what the student says. 9. *STUDENT TALK--INITIATION: talk by students which they initiate. Unpredictable statements in response to teacher. Shift from 8 to 9 as student introduces own ideas.
		10. *SILENCE OR CONFUSION: pauses, short periods of silence and periods of confusion in which communication cannot be understood by the observer.

[a]Reproduced from Medley and Mitzel, "Classroom Behavior," p. 272.

*There is NO scale implied by these numbers. Each number is classificatory, it designates a particular kind of communication event. To write these numbers down during observation is to enumerate, not to judge a position on a scale.

'teaching,' interaction analysis applies only to the content-free characteristics of verbal communication."[1]

Using the system of ten categories shown in Table 1, the observer at the end of each three-second period writes down the number of the category he thinks best represents the "communication behavior" during that three seconds. At the same time he is doing this he is also observing the next three-second period. Having been trained to work rhythmically, the observer proceeds smoothly through a sequence of such simultaneous observations and recordings. However, during lengthy periods of silence or confusion, such as when the teacher is writing on the chlakboard, the observer records the lengths of such periods and writes brief anecdotal statements about what transpires. In general, then, the observer notes at all times the kind of class activity he is observing.

Since the first seven observational categories are assigned exclusively to teacher talk, no difficulty is experienced in interpreting the tally sheets as concerns the frequency or duration of teacher talk. However, in order to show when a different student begins to talk, the observer inserts a 10 in the sequence of student-to-student communication to indicate that one student has stopped and another student has begun to talk.

Upon completion of the recording of the sequence of events in the classroom, the lists of numbers thus derived may be entered into a 10-row by 10-column table, which is commonly called a "10 x 10 matrix."[2] (See Table 2.) Tabulations are made in the matrix to represent pairs of numbers, and the particular cell in which tabulations of the pair is made is determined by using the first number in the pair for the column. For example, as shown in Table 2, if a teacher asks a question in one three-second interval and a student responds in the next, so that a 4 is followed by an 8 in the record, a tally would be made in row 4, column 8. In order

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[1]Ned A. Flanders, "Some Relationships among Teacher Influence, Pupil Attitudes, and Achievement," in Contemporary Research on Teacher Effectiveness, ed. by Bruce J. Biddle and William J. Ellena (New York: Holt, Rinehart and Winston, Inc., 1964), p. 198.

[2]Edmund J. Amidon and Ned A. Flanders, The Role of the Teacher in the Classroom: A Manual for Understanding and Improving Teachers' Classroom Behavior (Minneapolis, Minn.: Paul S. Amidon & Associates, Inc., 1963).

TABLE 2.--Sample interaction matrix[a]

First \ Second	1	2	3	4	5	6	7	8	9	10	
1	1			1							
2			1								
3			1							1	
4								1			
5											
6	1									1	
7						1					
8		1						11			
9											
10						1	1				
Total	2	1	2	1	0	2	1	3	0	2	14

(Rows = First; Columns = Second)

[a]Reproduced from Amidon and Flanders, Role of the Teacher, p. 27.

to maintain symmetry within the matrix, the tabulator ensures that a 10 appears in the sequence at the beginning and at the end of each sequence.

Clusters of tallies in certain areas of the matrix provide information about specific aspects of the observed classroom interaction.[1] Figure 1 indicates some of these areas and the information they provide. In this example, it is seen that Area A measures the amount of teacher talk, Area B indicates the amount of student talk, Area D indicates frequent use of "indirect influence" statements by the

[1]Ibid., pp. 31-43.

		Second Three Seconds									
		1	2	3	4	5	6	7	8	9	10
First Three Seconds	1. T. accepts feeling	D. Indirect Influence Pairs							H. Teacher Stimulates Student Talk		
	2. T. praises/encourages										
	3. T. accepts/uses ideas										
	4. T. asks questions										
	5. T. lectures										
	6. T. gives directions					E. Direct Influence Pairs					
	7. T. criticizes/justifies										
	8. Student responds	F. Teacher-Reactions to Student Talking							G. Sustained Student Communication		
	9. Student Initiates										
	10. Silence/Confusion										
	Totals	A. Teacher Talk							B. Student Talk		C.

Fig. 1.--Flanders' Matrix with Areas of Particular Interest Identified (Reproduced from Medley and Mitzel, "Classroom Behavior," p. 273).

teacher, and so on. By counting the number of tallies in such particular areas of interest, the investigator obtains "scores" which may be manipulated arithmetically to test hypotheses.[1]

It appeared, therefore, that the Flanders' observation schedule would be appropriate for use in deriving the data needed to test the hypotheses of this study. For example, the distribution of tallies in column 3 of a matrix would represent all "use of students' ideas" cues that were buried in teacher talk, and the column 3 total would represent the "scores" for this cue in any teacher's interactions with any given student or group of students.

Hence, the Flanders system was selected as one of the principal instruments for deriving data useful to this study.

Reliability for the Flanders' observation schedule is established through the training of observers. As elaborated upon in the next chapter on methodology, the level of interobserver reliability in this study exceeded .80, with an average for the entire period of observations of around .805.

Content validity for this instrument derives from accurate interpretation during both encoding and decoding. In other words, as Flanders points out, the issue of validity in coding "depends on whether what was encoded did in fact exist and whether these elements of the original situation are recreated in their proper perspective during the decoding process."[2] Therefore, it would appear that "encoding" validity was closely related to the established interobserver reliability, and that whether or not a satisfactory level of "decoding" validity was attained will depend on the level of acceptability and accuracy of the interpretations that were made of the interaction displays used in this study. In regards to face validity of the Flanders instrument, it appears to be satisfactory since all events can be classified into one of the ten categories provided.

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[1] Ibid., pp. 28-30.

[2] Ned A. Flanders, Analyzing Teaching Behavior (Reading, Mass.: Addison-Wesley Publishing Co., Inc., 1970), p. 87.

The Measurement of Achievement

Achievement was measured by the reading subtest of the Wide Range Achievement Test (WRAT).[1] Inasmuch as the WRAT was especially designed for use in conducting studies of basic school subjects, it was considered particularly appropriate for use with this study of an Adult Basic Education environment.

There were three principal reasons for using only the reading subtest of the WRAT achievement battery. First, it had been observed from prior visits to the type classrooms used in this study that teachers interacted more frequently and for longer periods of time with individual students in reading sessions than in any other academic subjects taught. Second, the length of time allotted to reading in such programs would provide ample time for observers to obtain interaction data between each teacher and each student. Third, since the reading subtest of the WRAT is primarily a word recognition test, it would facilitate the development of a plausible means for implanting differential expectations in the minds of teachers, as discussed more fully in the next chapter on methodology.

Jastak and Jastak report two types of reliability for the WRAT--clinical reliability and statistical reliability. For clinical reliability they derived coefficients ranging from .90 to .95 for each subtest and an average reliability of .93, based on clinical experience and validity calculations.[2] As regards statistical reliability, Jastak and Jastak state that "correlation coefficients (even in such homogeneous groups as policemen and nurses) ranged from .92 to .98 for the reading and spelling tests. . . ."[3]

The validity of the WRAT has been estimated in several ways. Of particular interest to this study is that the reading subtest was found to have high sensitivity to various educational and environmental backgrounds, as determined by comparisons of its results with those obtained from the Weschler Adult Intelligence Scale (WAIS). One such comparison was made in a group of 56 culturally and

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[1] J. F. Jastak and S. R. Jastak, The Wide Range Achievement Test (Wilmington, Delaware: Guidance Associates, 1965), pp. 1-56.

[2] Ibid., p. 14.

[3] Ibid., p. 13.

educationally deprived adolescents and adults (16 and up), where the WRAT mean reading score was 77.23 as compared to WAIS means of 81.07, 93.63, and 85.54 for verbal, performance, and full scale factors, respectively. Although agreements between these mean scores are close, it is interesting to note that achievement results as determined by the WRAT are significantly lower than the group's abilities as measured by the WAIS.[1] Another comparison of the validity of the WRAT reading subtest WAIS measures (in a group of 290 adults, 16 and up) yielded intercorrelations of .84, .60, and .76 with the verbal, performance, and full scale quotients, respectively.[2]

The internal consistency, or another measure of validity of the WRAT subtests has also been estimated in a number of ways. For example, in a group of adults (20 and up) intercorrelations of .858 for reading versus spelling subtests and .660 for reading versus arithmetic subtests were found to be highly significant.[3]

By way of summary, it appears from the reports by the authors of the current edition of the Wide Range Achievement Test that this instrument has acceptable levels of reliability and validity. However, this cannot be confirmed, inasmuch as there are no critiques on the current edition of the WRAT.[4]

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[1] Ibid., p. 16.

[2] Ibid., p. 18.

[3] Ibid., p. 17.

[4] Oscar K. Buros, ed., The Sixth Mental Measurements Yearbook (Highland Park, N.J.: The Gryphon Press, 1965), p. 128.

CHAPTER IV

METHODOLOGY

The purpose of this chapter is to present the procedures that were followed in the conduct of this investigation. These procedures include (1) selection of the experimental site, (2) selection of teachers and assignment of individuals to groups, (3) introduction of differential expectations, (4) preparation of technicians and observers, (5) collection of the data, and (6) reduction of the data.

Selection of the Experimental Site

The Adult Basic Education (ABE) program was selected as the general setting for this study.

ABE-type adult education programs are composed predominantly of middle-class teachers and lower-class, illiterate or functionally illiterate adult students. Thus it was thought that there should be in ABE programs a teacher-student relationship similar to the middle-class teacher/Mexican-American youth relationship that was studied by Rosenthal and Jacobson.[1] In other words, it was suspected that ABE teachers, although quite unconsciously, may generally hold and unintentionally convey to their students low expectations for ABE student achievement.

The specific setting selected for the study was a southeastern United States county which encompasses an expansive metropolitan area with nineteen well-developed ABE programs. Originally, it had been planned to utilize a group in each of four ABE centers, with random selection of a teacher for each group from among all available ABE reading teachers in the county. However, in the interest of

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[1]Robert Rosenthal and Lenora F. Jacobson, Pygmalion in the Classroom: Teacher Expectations and Pupil's Intellectual Development (New York: Holt, Rinehart and Winston, Inc., 1968), p. 62.

27

maximizing student cooperation and minimizing the possibility of a sharp increase in dropouts among ABE students who are noticeably quite sensitive to changes of their instructors, it was decided to house the entire study in one large ABE center. Each participant still experienced a change of his reading instructor, but the change was to someone who was not a complete stranger to him.

Choosing Teachers and Assigning Individuals to Groups

Since it was necessary to provide meeting times that would accommodate the maximum number of students, the night school principal designated the four teachers (from among the seven available reading teachers) who could most likely teach regularly at the optimum times of Monday, Tuesday, and Wednescay nights. The names of these four teachers were then placed in a hat and withdrawn one by one by a disinterested person. The first name withdrawn was assigned to Group A, the second to Group B, the third to Group C, and the fourth to Group D. The meeting time for each group was that required or most desired by the instructor, so that Groups B and D met on Monday nights, Group A met on Tuesday nights, and Group C met on Wednesday nights.

The first step in composing the four groups was the administration of the Wide Range Achievement Test to everyone who attended classes at the ABE center during the period February 9, 1970 through March 5, 1970. In this manner pretest results were obtained on forty-four individuals, from whom thirty-two were selected on the basis of prior attendance records as the ones most likely to continue in the program through the proposed ten weeks for the experiment (March 31, 1970 through June 8, 1970).

These thirty-two individuals were then assigned to the various groups on the basis of the evening each would most likely be in regular attendance; for example, if an individual was known to have to work at his job on Monday night and also liked to attend prayer meeting at his church on Wednesday night, he was assigned to Group A (Tuesday evening). However, the overriding requirement of having each student work with a "new" reading instructor was met in all thirty-two assignments to groups.

As one of the purposes of this study was to re-examine the relationship between teachers' differential expectations and student achievement, the final step in

composing the groups was to insure an approximate balance between experimental and control subjects along the ability variable. Therefore, on the basis of the pretest results, experimental and control subjects were selected and balanced in each of the four groups as follows: one of the two highest scorers was designated a control subject, the other an experimental subject; one of the two lowest scorers was designated a control subject, the other an experimental subject; the next two higher and two lower scorers were designated as control or experimental subjects in a similar manner; and so on until four experimental and four control subjects were designated for each group. The randomizing technique of coin tossing was used throughout this procedure in deciding which member of each pair was designated an experimental subject and which member was designated a control subject.

Table 3 illustrates the resultant distribution of teachers and subjects in the four groups.

TABLE 3.--Distribution of teachers and subjects

Teacher	n_e	Experimental Group	n_c	Control Group
A	4	2 H[a] 2 L[b]	4	2 H 2 L
B	4	2 H 2 L	4	2 H 2 L
C	4	2 H 2 L	4	2 H 2 L
D	4	2 H 2 L	4	2 H 2 L
	n_e=16	8 H 8 L	n_c=16	8 H 8 L

[a]H indicates relative high achievement score.

[b]L indicates relative low achievement score.

A description of teachers and students is presented in Appendix A.

Achievement Expectations

Although experimental and control subjects were actually balanced on the basis of pretest performance, as noted above, their teachers were led to believe that the experimental subjects were selected by virtue of their high potential for rapid academic progress, while the control subjects were selected as being representative of the "average-type" ABE participant.

The reasons that were given the teachers as to why they should expect superior performance among experimental subjects were, allegedly, that these subjects were able to recognize and pronounce certain key predictor words at their respective grade equivalent levels, as evidenced by their performance on the WRAT reading test, and that, consequently, these ABE participants were most likely to enjoy rapid academic progress in the near future. Further, the teachers were told that the purpose of the experiment was to make a comparative study of the verbal behaviors of these potential "late blooming ABE students" versus the verbal behaviors of "average ABE students" (such as those who served as control subjects). Finally, the teachers were asked to avoid distorting or biasing the results of the experiment by refraining from any discussion of the nature or purpose of the experiment with students or anyone else during the course of the experiment. A copy of the letter sent to each of the four teachers is presented in Appendix B.

Thus higher but unfounded achievement expectations for the experimental than for the control subjects were implanted in the mind of each of the four teachers, the thirty-two subjects knew only that they were involved in an experiment, and the true purpose of the experiment was screened from teachers and subjects alike.

Training Technicians and Observers

In the interest of establishing and maintaining the best possible rapport between observers and the highly sensitive minority group subjects, it was decided to use paraprofessionals (teacher aides) instead of college students, as originally planned, to record and make anecdotal notes on teacher-subject interactions. Two aides were trained to optimize the quality of tape recordings of class sessions and to maintain a chronological record of events in the classroom, with special emphasis on denoting what particular student the teacher was talking to at any given

moment or during any period of time. Neither the training nor the subsequent recordings posed any great problems, as it was usually quite obvious which student the teacher was working with in the highly individualized tutorials that are normally used for teaching reading in ABE programs.

By using the master tapes and chronological records of events that were developed by the teacher aide technicians, the writer transposed onto separate tapes for each student the interactions that occurred between that student and his teacher.

Four doctoral students in adult education served as observers for this project. Three of the four had had previous training and experience in observing and categorizing classroom interactions.

These observers met three times a week for approximately two hours each session, and for a total of about ten hours of training. The Flanders observer training kit was used in this training. This kit consists of a training manual for observers, tape recordings of teaching episodes, and detailed typescripts of the recorded teaching episodes. After discussing and becoming thoroughly familiar with the purpose of interaction analysis in the classroom, the categories used in the Flanders instrument and the procedures for its use, as well as some of the problems of observer training, the observers moved into the practice stage.

Mastery of the categories and procedures was facilitated through the use of Flanders' training tapes of classroom episodes and the detailed accompanying typescripts. Periodic reliability checks were made, using Scott's technique of reporting interobserver agreement while assigning verbal behavior items to a set of categories.[1] Scott's method has been used extensively with the Flanders system because it is "unaffected by low frequencies, can be adapted to percent figures, can be estimated more rapidly in the field, and is more sensitive at higher levels of reliability."[2]

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[1]William A. Scott, "Reliability of Content Analysis: The Case of Nominal Scale Coding," Public Opinion Quarterly, XIX (1955), 321-325.

[2]Ned A. Flanders, Interaction Analysis in the Classroom: A Manual For Observers (Ann Arbor: The University of Michigan, 1966), p. 13.

The training of observers continued until all had attained a Scott reliability coefficient which fluctuated around 0.77, or a 77 percent level of agreement with Flanders' categorizations of the teaching episodes as given in the typescripts. The reliability computation for one of the observers is shown in Appendix C.

Collection of the Data

Each observer was then assigned the task of categorizing the recorded verbal interactions of the teacher and students in one group. The purpose of having an observer categorize interactions in one group only was to maximize the amount of feeling the observer could attain for how the teacher said what he said while interacting with ABE students for whom he held differential expectations.

Reliability checks were accomplished by randomly selecting a tape recording and determining the amount of agreement for each observer with the writer on its analysis. The reliability for the observers was: 69.68, 77.71, and 94.10, or an average interobserver reliability of 80.48.

The observers categorized the interactions of the four teachers with a total of ten experimental and thirteen control subjects. No interaction data were available on the six experimental and three control subjects who dropped out of the ABE programs. The total number of interactions between the teacher and each student varied, depending on such factors as the nature of the materials being taught, the amount of time the student needed help from the teacher, or how often the teacher chose to work with a given student.

The collection of posttest achievement data was accomplished during the latter part of the experiment through the administration of the WRAT reading test to all participants on whom interaction data had been collected. As was the case with the collection of pretest achievement data, the WRAT was administrered during posttesting by trained guidance counselors. These counselors were thoroughly familiar with the test and its proper administration, since the WRAT is the standard achievement test in use throughout the ABE programs of the county used in this study.

32

Reduction of the Data

Ary, Gotts, and Shaver's technique was used to produce computer decks from the observers' categorizations of the teacher-student interactions.[1] That is, the observers recorded their observations directly onto IBM sheet No. 556, and these data were then transferred to IBM cards by processing the IBM sheets through the IBM No. 1230 scoring machine.

The interaction matrices thus derived were similar to manually produced matrices, such as the one shown in Table 2. However, in addition to presenting row and column totals and numbers of interaction pairs, the computer produced matrices which displayed the percentage of total interaction pairs for each column and each row.

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[1]Donald Ary, Edward Gotts, and John Shaver, "A Scheme for Optimizing Computer Use in Flanders Interaction Data Collection and Analysis," Classroom Interaction Newsletter, VI (December, 1968), 41-45.

CHAPTER V

DATA ANALYSES: PROCEDURES AND RESULTS

This chapter is devoted to (1) a description of the statistical procedures followed in the data analyses and (2) the reporting of the results obtained in which the basic hypotheses in the study were tested.

Relationships Between Variables

Prophecies and Verbal Cues

One of the primary concerns of this study was the question of whether teachers who were led to expect rapid growth from some of their students would verbally relate to those students any differently than to their other students. It was therefore hypothesized in the null form that there is no significant relationship between teachers' expectations and their verbal cues to students.

The first step in testing this hypothesis was to derive interaction matrices--one for the experimental subjects and one for the control subjects. Accordingly, the IBM cards that had been previously loaded with the interaction data for the two groups of subjects were used with a computer program developed by Steg to derive the interaction matrices, as shown in Tables 4 and 5.[1]

The second step in testing the hypothesis on the relationship of teachers' prophecies to their verbal cues to students entailed a test for overall differences between the two interaction matrices. Inasmuch as there exists a basic interdependence of the communication events that are used to

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[1]S. Eric Steg, "Likelihood Ratio Criterion Test for the Equality of Cell Proportions in Transition Matrices" (unpublished paper, Department of Statistics, Florida State University, 1970).

TABLE 4.--Interaction matrix for control subjects

Category	1	2	3	4	5	6	7	8	9	10	Total
1	2	5	4	1	6	2	-	3	2	4	29
2	1	61	17	34	64	53	-	58	25	50	363
3	1	10	55	41	139	18	-	200	30	29	522
4	1	14	2	140	54	16	1	247	52	80	607
5	7	26	12	143	2219	119	1	272	453	236	3488
6	1	30	4	52	73	750	-	101	60	102	1173
7	-	1	-	2	1	1	5	2	1	1	14
8	8	120	290	95	260	69	4	1948	44	240	3078
9	8	46	100	20	399	51	1	24	650	165	1462
10	3	53	39	77	292	96	1	224	155	1314	2254
Total	29	366	523	605	3507	1175	13	3079	1472	2221	12990[a]
% GT	0.22	2.82	4.03	4.66	27.00	9.04	0.10	23.70	11.33	17.10	(100)

[a]Grand Total (GT).

TABLE 5.--Interaction matrix for experimental subjects

Category	1	2	3	4	5	6	7	8	9	10	Total
1	2	7	4	5	7	3	-	4	5	14	51
2	7	56	63	67	96	66	1	67	41	73	537
3	4	12	113	70	187	18	-	255	64	41	764
4	3	25	9	200	53	33	-	333	147	121	924
5	4	36	22	207	2542	112	2	262	255	247	3689
6	2	26	2	61	88	591	-	113	22	147	1052
7	-	2	-	-	1	3	24	-	-	3	33
8	5	165	331	115	237	99	1	2646	73	276	3948
9	11	116	179	67	191	19	-	24	578	101	1286
10	12	94	43	133	284	113	5	258	117	1904	2963
Total	50	539	766	925	3686	1057	33	3962	1302	2927	15247[a]
% GT	0.33	3.53	5.02	6.07	24.17	6.93	0.22	25.99	8.54	19.20	(100)

[a]Grand Total (GT).

derive verbal interaction matrices, it was necessary to utilize Darwin's specially-developed likelihood criterion test for differences in the frequency distributions of two or more matrices.[1] This was accomplished through the application of Steg's computer program, which incorporates Darwin's likelihood criterion test (commonly known as "Darwin's Chi-square").[2] The results obtained from this test are shown in Table 6.

TABLE 6.--Test for overall differences between the two composite interaction matrices

Darwin's Statistic	Transition Probabilities	Equality of Column Total: Grand Total Ratios	Equality of Fixed-state Cells
χ^2 observed	496.05	410.63	85.42
χ^2 .05,90 df	113.15		
χ^2 .05,80 df		101.88	
χ^2 .05,10 df			18.31

It is obvious from an inspection of Table 6 that the observed Darwin Chi-square values are significant beyond the .05 level on all three criterion tests of comparisons of the two matrices. Darwin's transition probabilities test is a test for overall equality of the transitions from each communication event to the next communication event throughout the two matrices. It consists of a combination of the other two criterion tests--the test for equality of the ratios of column totals (transition pairs) to grand totals, and the test for equality of the steady state or diagonal cells (such as the cell formed by the intersection of row four with column four) in the two matrices. From the analyses of the matrices along these three dimensions, the conclusion is drawn that the first null hypothesis is rejected, as the probability of a chance occurrence

[1] J. H. Darwin, "Note on the Comparison of Several Realizations of a Markov Chain," Biometrika, Vol. 46 (1954), pp. 412-419.

[2] Steg, "Likelihood Ratio Criterion Test."

of a relationship between teachers' prophecies and their verbal cues to students is less than five percent.

However, such an empirical relationship is of little practical value unless it is reduced to more specific terms. Thus the final step in the analysis of the relationship of prophecies to verbal cues consisted of a series of tests of relationships between various subsets of matrix data, which, as previously defined in the chapter on the conceptual framework, represent specific verbal cues used by teachers during teacher-student interactions.

A graphic display of the distribution of the specific verbal cues used by teachers in their interactions with control and experimental subjects is shown in Figure 2. Data in this figure were extracted from column totals and combinations of column totals of the control and experimental matrices, Tables 3 and 4. The percent of total tallies, therefore, are actually ratios of the column totals to grand totals of the paired sequences of communication events that generated the matrices. Moreover, these percentages (ratios) represent the amount of time the teachers devoted to the various generic categories of verbal behavior, or specific verbal cues, such as category 3, "accepting or using ideas of students." Finally, it should be noted that the combinations of category numbers 1 through 4 and 5 through 7 represent the cumulative percentages of total time the teachers used "indirect influence" and "direct influence," respectively, while interacting with the students.

As suggested by Peña, the "t test of difference between proportions" was used to test for differences between ratios for control and experimental subjects on each of the interaction variables depicted in Figure 2.[1] The results of these tests are shown in Table 7.

The t ratios in the following tests are significant beyond the .05 level on all categories except number one (accepting or enlarging upon student's expressed feeling), where the direction of difference is indicated by the magnitude of the comparative ratios. Therefore, it is concluded that results of tests of the several sub-hypotheses generally substantiate the previous rejection of the first null hypothesis of no relationship between teachers' prophecies and their verbal cues to students.

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[1]Personal communication from Dely Peña, Assistant to Ned A. Flanders, Offices of Research Service, University of Michigan, June, 1969.

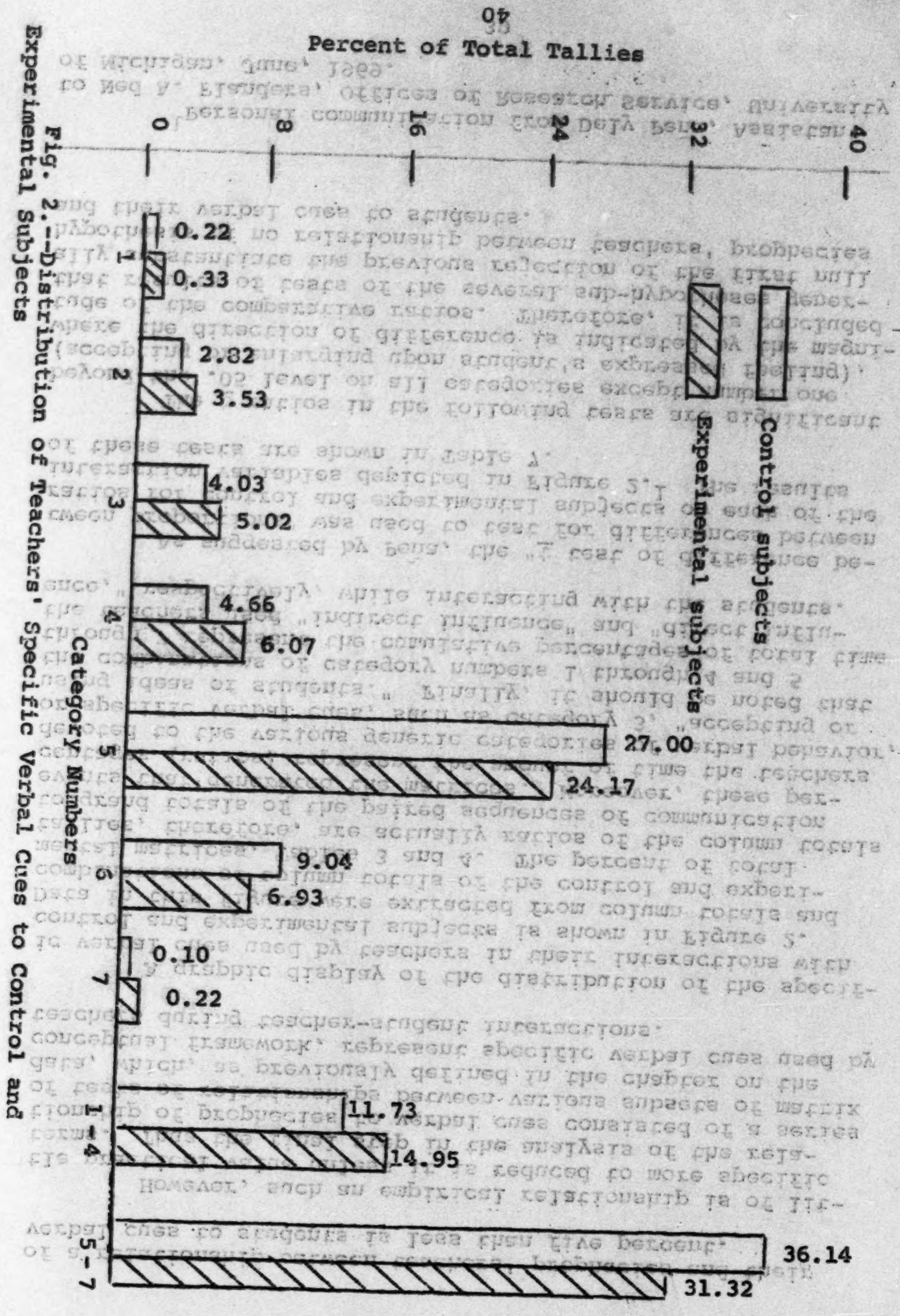

Fig. 2.--Distribution of Teachers' Specific Verbal Cues to Control and Experimental Subjects

TABLE 7.--Test for differences between selected submatrix areas of the two composite interaction matrices

Category Numbers	P_1 Control N=12,990	P_2 Experimental N=15,247	t ratio
1	.0022	.0033	1.691
2	.0282	.0353	3.440**
3	.0403	.0502	4.039**
4	.0466	.0607	5.271**
5	.2700	.2417	5.413**
6	.0904	.0693	6.498**
7	.0010	.0022	2.483*
1-4	.1172	.1495	7.998**
5-7	.3614	.3132	8.535**

*$p < .05$, two-tail.

**$p < .01$, two-tail.

By way of summary of the tests of prophecy-verbal cue relationships, the results of the analyses of the data generally support the rejection of the first null hypothesis, beyond the five percent level of significance in four, and beyond the one percent level of significance in seven out of the total of twelve statistical tests to which the data were subjected. In other words, there appears to be a significant relationship between teachers' levels of expectations for their students' performances and the manner in which they relate verbally to the students.

Verbal Cues and Achievement

Another objective of this study was to determine whether or not there is a significant relationship between teachers' verbal cues to students for whom they hold unfounded differential expectations and the levels of

achievement attained by the students. It was therefore hypothesized in the null form that there is no significant relationship between teachers' verbal cues and student achievement.

Program BMD-02-D, "Correlation with Transgeneration," was used to compute the correlation coefficients needed to test this hypothesis.[1] The correlations obtained from this analysis of the data are shown in Table 8.

It is obvious from an inspection of Table 8 that there are no significant correlations at the .05 level between verbal cues and levels of achievement. On the basis of the results of these analyses, therefore, the conclusion is drawn that the second null hypothesis is not rejected, as the probability of a chance occurrence of a relationship between teachers' verbal cues and student achievement is greater than five percent.

Prophecies and Achievement

A third concern of this study was the question of whether teachers who held differential expectations for their ABE students' achievement potentials would somehow influence the net achievement gains of such adults in ways consistent with their expectations. This question generated the third null hypothesis of the investigation, which maintained that there is no significant relationship between teachers' expectations and student achievement.

Since there were less than fifteen subjects in each of the two groups, the Walsh nonparametric test was used, preliminarily, to determine whether or not there was a significant difference in pre- and posttest performance by subjects within groups.[2] The results of these analyses revealed significant gains in achievement, beyond the .05 level (one-tail), by the experimental subjects but not by the control subjects.

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[1] W. J. Dixon, Ed., Biomedical Computer Programs (Los Angeles: University of California Press, 1968), pp. 49-59.

[2] Sidney Siegel, Nonparametric Statistics for the Behavioral Sciences (New York: McGraw-Hill Book Co., Inc., 1956), pp. 83-87.

TABLE 8.--Correlations of verbal cues with achievement scores adjusted for initial ability

Group	Category Numbers								
	1	2	3	4	5	6	7	1-4	5-7
Control[a] (n=13; 11 df)	.022	-.246	-.193	.105	.510	-.309	.545	-.125	.247
Experimental[b] (n=10; 8 df)	.095	-.033	.542	-.109	.361	-.544	-.513	.295	.090

[a]For the control group, .553 is the critical value of r at the .05 level, two-tail.

[b]For the experimental group, .632 is the critical value of r at the .05 level, two-tail.

The pre- and posttest achievement data on the thirteen control subjects and ten experimental subjects were then subjected to an analysis of covariance for multiple covariates, using Program BMD-04-V.[1] The analysis of covariance technique was used in order to statistically adjust for the possible effects of the uncontrolled variable, initial reading ability.

The preliminary yield of the analysis of covariance, as shown in Table 9, indicates that initial reading ability did have a vitiating effect on achievement. This effect is evidenced by the magnitude and direction of the statistical adjustments (application of regression coefficients) to the means of the posttest achievement scores for the two groups.

As shown in Table 10, the remaining portion of the analysis of covariance yielded an F-ratio which is significant beyond the .05 level.

The conclusion is therefore drawn that the third hypothesis is rejected, since the probability of a chance occurrence of a relationship between teachers' expectations and the levels of achievement attained by their students is less than five percent. In other words, the net adjusted achievement of the experimental group was significantly higher than that attained by the control group.

TABLE 9.--Means of posttest achievement scores adjusted for pretest reading ability

Group	Pretest	Posttest	Posttest (adjusted)
Control (n=13)	61.85	61.54	58.34
Experimental (n=10)	54.70	56.20	60.36

[1]Dixon, Computer Programs, pp. 525-542.

TABLE 10.--Analysis of covariance of pre- and posttest achievement scores, with pretest reading ability the covariant

Source	df	MS	F
Between groups (adjusted means)	1	21.62	4.535*
Within groups	20	4.77	

*$p < .05$

Summary

In this chapter, presentations have been made of the procedures followed and the results obtained from data analyses conducted for the purpose of testing the three main hypotheses and nine sub-hypotheses in this study.

The relationships between and among variables have been examined. Results from statistical analyses (Darwin Chi-square, t test, Product-Moment Correlation, and analysis of covariance techniques) provided the bases upon which hypotheses were accepted or rejected. The probability level of .05 was generally used to decide whether to accept or reject the hypotheses; however, higher levels of significance were reported wherever found.

The null hypothesis concerning the relationship between teachers' prophecies and their verbal cues to students was rejected, both in terms of general verbal behaviors and in terms of specific verbal behaviors (except the verbal cue "accepting or enlarging upon students' expressed feelings," which was not significant at the .05 level). The null hypothesis concerning the relationship between teachers' verbal cues and levels of achievement attained by their students was not rejected at the .05 level. Finally, the null hypothesis concerning the relationship between teachers' prophecies and levels of achievement attained by their students was rejected at the .05 level of significance.

CHAPTER VI

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

The contents of this chapter are presented in three principal sections: (1) Summary of the Study, (2) Conclusions, and (3) Implications.

Summary of the Study

The significant aspects of the investigation are summarized in terms of: The Study and Its Objectives, Theoretical Considerations, Research Procedures, and Findings of the Study.

The Study and Its Objectives

In recent years researchers have become engaged in a number of explorations aimed at determining and explaining how one person's unfounded expectation of another's behavior can somehow come to serve as a self-fulfilling prophecy. Laboratory experiments have produced evidence of the operation and effects of this phenomenon, and at least one large scale field study has demonstrated the presence and influence of self-fulfilling prophecies in the domain of interpersonal relations.

Although empirical evidence has already been compiled on a variety of possible means by which prophecies could be communicated from prophets to subjects, an adequate explanation of prophecy communication has not yet been formulated. However, it appeared from a perusal of the literature that efforts were focusing on prophets' verbal and auditory cues as the most likely mode of prophecy communication. Moreover, investigators were suggesting the need for systematic on-the-scene recordings and analyses of the verbal behaviors of prophets under conditions where the phenomenon would be operating.

Based upon previous research evidence, then, plus considerations of the possible importance of this phenomenon and its operation to ongoing educational programs for thousands of disadvantaged adults, this writer determined the need for research aimed at isolating and analyzing teachers' verbal cues to students in an Adult Basic Education environment. Consequently, the underlying purpose of the study was to determine whether or not prophets employ verbal cues in communicating differential expectations to subjects. In addition, the study was designed to explore the relationships, if any, that exist between prophets' verbal cues and observed changes in the intellectual behaviors of subjects. Finally, the purpose of the study was to examine the relationship between teachers' prophecies and student achievement.

The following specific objectives were therefore formulated to guide and direct this study:

(1) to determine if a significant relationship exists between teachers' expectations and their verbal cues to students;

(2) to determine if a significant relationship exists between teachers' verbal cues and student achievement; and,

(3) to determine if a significant relationship exists between teachers' expectations and student achievement.

Theoretical Considerations

The theoretical foundation of this study was based upon a combination of: (1) an evolving network of concepts on the psychology of unintentional influence in prophet-subject interactions; (2) a theory of communicative acts which suggests that interacting persons strive to achieve and maintain co-orientation toward common attitude objects; and (3) a portion of a social psychological theory of interaction which suggests that teachers control their own influence on students through the spontaneous usage of appropriate content-free statements during their interactions with the students. Interaction was therefore the thread of commonality in the conceptual framework of the study. To fully understand interaction, it would be necessary to study the total psychological field, which is composed of all forces (cultural, socio-economical, psychological) that impinge upon and influence the interaction of participants. As it was not possible to study the total psychological

field, a simple theory of the interrelationships of relatively few variables, all of which could be measured, was postulated and used in the study.

Research Procedures

Pretest achievement scores of all potential subjects in a large metropolitan Adult Basic Education Center in a southeastern United States county were used to select and randomly balance four groups of subjects, with each group consisting of four control and four experimental subjects, so that there were equal numbers of high scorers and low scorers in each group. Four teachers were selected from among seven available reading teachers and randomly assigned to the groups.

Application of Treatment

Each of the four teachers was led to expect high achievement from only the four experimental subjects in his group. That is, unfounded high expectations were conveyed to the teachers relative to certain students' achievement potentials.

Data Collection: Interaction

Two teacher-aide technicians were trained to make tape recordings and anecdotal notes on teacher-subject interactions in the four groups. These technicians were also trained to maintain accurate chronological records of events in the classroom, with emphasis upon denoting the particular student with whom the teacher was interacting at any given instant of time. From the master tapes and written records thus derived, this writer transposed onto separate tapes the interactions that occurred between each student and his teacher in the tutorial settings.

Four observers were trained in the use of the Flanders Interaction Category System to collect data, who then categorized the verbal interactions from the transposed tapes. Three of the four had previous training and experience in observing and categorizing teacher-student interactions. Flanders' observer training kits (training manuals, tape recordings, and associated typescripts of teaching episodes) were used in the training sessions, which totalled about ten hours over a two-week period. The training was terminated when inter-observer reliability against

Flanders' categorizations of the teaching episodes exceeded the 75 percent level of agreement. The reliability for each of the observers during actual categorizations of teacher-student interactions was: 69.68, 77.71, and 94.10, or an average of 80.48. These reliability coefficients were computed by Scott's method, and they represent the amount of agreement with the writer, who was one of the four observers.

Data Collection: Achievement

The achievement data were collected immediately before implementation of the ten-week study and just prior to its conclusions. Trained guidance counselors collected this pre- and posttest data by administering the reading subtest of Jastak and Jastak's Wide Range Achievement Test.

Reduction of the Data

The interaction data from the observers' categorizations of teacher-student interactions were transferred to data process cards through the use of Ary, Gotts, and Shaver's technique for optimizing computer use with the Flanders observational system. Processing of the data cards produced interaction matrices which displayed percentages of total interaction pairs for each column and row.

Darwin Chi-square, t test, Product-Moment Correlation, and analysis of covariance statistical techniques were used to test the research hypotheses on relationships between and among variables.

The Findings

The findings in the study are summarized in terms of the null hypotheses stated in Chapter II, as follows:

H_o There is no significant relationship between teachers' expectations and their verbal cues to students.

The null hypothesis was rejected at the .05 level of significance.

H_o There is no significant relationship between teachers' verbal cues and student achievement.

The null hypothesis was not rejected at the .05 level of significance.

H_o There is no significant relationship between teachers' expectations and student achievement.

The null hypothesis was rejected at the .05 level of significance.

Conclusions

On the basis of the procedures used and the findings reported in Chapter V, it appeared reasonable to draw certain conclusions in regard to this study. However, before considering the conclusions, there are certain limitations to the investigation which should be brought to the attention of the reader.

Only one Adult Basic Education program was used, and both teachers and students were Negro residents of a metropolitan community in the southeastern United States. The findings of the study are therefore applicable only to: (1) a limited geographical area; (2) a specific type educational program for adults; and (3) the particular population from which the samples of teachers and subjects were drawn.

As alluded to earlier in the section on theoretical considerations, only a few of the many variables that make up the total psychological field of an individual were treated in this study. Thus, several variables which were unaccounted for may have influenced the procedures and the outcomes relative to both teachers and subjects.

The instrument used to collect interaction data may not possess the degree of sensitivity needed to detect and discriminate between all of the subtle verbal cues employed by the teachers in their interactions with the students. This possible lack of sensitivity may partially account for the findings of significant relationships between prophecies and achievement, but not between verbal cues and achievement.

Finally, it will be recalled that the review of related literature in Chapter I includes examples of the influence of experimenter bias in behavioral research. Despite the special efforts of this writer to consciously control for the possible effects of his own biases, therefore, it is still possible that this variable crept into the study and influenced the results. Similarly, the several persons who assisted with the data collection could have

unconsciously allowed their biases to influence their judgments and decisions relative to teachers' and students' performances.

With these limitations in mind, and on the basis of the findings in this investigation, the following conclusions were reached:

1. A teacher's preconceived notions relative to the achievement potentials of his students will influence the types and rates of verbal interactions he has with the students.

2. The communication of the bias phenomenon cannot be explained on the basis of verbal cues alone. That is, the conveyance of differential expectations from prophet to subject probably involves a variety of communication modes (such as touch, posture, gestures) in addition to the prophet's verbal behaviors.

3. Levels of achievement attained by students are influenced by expectations that their teacher holds relative to their academic achievement potentials. The findings in this study support those of previous researchers whose studies propose such a relationship.

Implications

Implications for Theory

A major premise in this study derived from the social psychological theory that a person who senses asymmetry of orientation with another toward an attitude object which they both hold in common will attempt to establish co-orientation with the other person by influencing him, principally through the medium of communicative acts, toward his own orientation. It was therefore postulated that prophetic teachers would use communicative acts to establish and maintain teacher-student symmetry of orientation toward achievement expectations, the common attitude object.

This theoretical view was supported to the extent that significant relationships were found: (1) between teachers' prophecies [orientations toward the common attitude object] and their verbal cues to students [verbal communicative acts]; and (2) between teachers' prophecies and levels of student achievement [realizations of

achievement expectations]. Teachers verbal cues were not found to be significantly related to levels of student achievement, even though the evidence suggested the existence of teacher-student symmetry of orientation toward achievement expectations at the termination of the experiment. The obvious inference from this conflictive evidence in regards to the existence of co-orientation toward the common attitude object was that the theory was not entirely adequate for use in this study. However, this condition probably indicated, instead, that another type or other types of communicative acts were being used by the teachers to achieve and maintain a balanced teacher-student orientation toward the common attitude object. It was concluded, therefore, that results of this study generally supported this social psychological theory.

In a similar manner, the findings in this study generally supported the theoretical viewpoint that teachers control their own influence primarily through the medium of appropriate content-free statements (verbal communicative acts) during their spontaneous interactions with the students.

Finally, the outcomes of this investigation were considered to have inductive import to the emerging theory of unintentional influence. The concept of verbal cues played a significant role in the communication of the bias phenomenon, as evidenced by the empirical relationships that were found between prophecies and the various rates and types of verbal interactions the prophets had with the subjects. Thus the results seemed to support the notion of the centrality of verbal and auditory cues in the network of concepts needed to construct a theory of unintentional influence.

Implications for Practice

The outcomes of this study augmented and supplemented previous evidence which had been compiled on the possibility that teachers' expectations may serve as self-fulfilling prophecies. That is, unfounded teacher expectations led to improved intellectual performance in this study as in previous studies. It could well be, then, that a teacher gets more when he expects more.

This investigation of the self-fulfilling prophecy phenomenon and how it may be communicated was conducted exclusively in an environment where both students and teachers were adult members of the same minority ethnic group.

Thus it seemed logical to infer from the findings that the operation of the phenomenon may be even more pervasive than previously suspected. In other words, teachers may get more when they expect more, whether teaching children or adults, and irrespective of the color of the skins of either the teacher or his students.

Another practical implication inferred from the findings is that a teacher may use more indirect influence with students for whom he holds high expectations. That is, when a teacher expects more from a student, he may actively encourage that student to participate and thereby increase the student's freedom of action.

Implications for Further Research

This study revealed several implications for further research in regard to methodological considerations when conducting research in Adult Basic Education programs.

Many of the participants in such programs may be extremely sensitive to any attempt to modify either their normal routine or the environmental setting of their educational activities. Several of the subjects objected to the changes that were necessary in order to conduct this study. Some did not like to be recorded by "those machines"; some did not want to be separated from their existing classroom subgroups; some did not want to move to another classroom; and still others were fearful of having an observer or any other "outsider" in the classroom. Therefore, had they not been willing to discuss these objections with the writer, and to cooperate when they were satisfied that none of the circumstances or the personnel involved posed any immediate or delayed threat to either themselves or the other student participants, this study could not have been conducted. Such potential problems should be recognized by other investigators who are considering using ABE participants as research subjects. That is, it should be recognized that establishing and maintaining rapport in an ABE environment may be a demanding, expensive, time-consuming but necessary preliminary undertaking.

Researchers who contemplate the conduct of studies in ABE programs should also expect high dropout rates and absenteeism. Based on the experience of others as previously reported in the literature, this writer anticipated a dropout rate of twenty to twenty-five percent of the participants during the course of the actual study. This estimate

proved to be somewhat conservative, inasmuch as nine of the thirty-two subjects (28.1%) dropped out. Absenteeism varied from week to week, and for a short period (concomitant to the area's shift to daylight savings time) it became necessary for the principal of the ABE program and this writer to bolster the attendance rate by making personal visits to the homes of those subjects who were excessively absent. Again, then, researchers who plan projects in ABE programs should be prepared to cope with or compensate for high dropout rates and excessive absenteeism.

This exploratory study has barely touched upon the total problem of determining and explaining how one person's unfounded expectation of another's behavior can somehow come to serve as a self-fulfilling prophecy. Perhaps the most important implication that can be drawn from the study and its outcomes is that it simply re-emphasizes the incredible subtlety and complexity of the communication of the bias phenomenon. Future researchers on the mediation and effects of unintentional influence, therefore, may need to develop and employ special techniques, such as a detailed interaction schedule which would be capable of more precisely detecting and differentiating between the communicative acts used by prophets. The need for such research is overwhelming, especially in the educational programs for disadvantaged adults. As pointed out in Chapter I concerning the need for the present study, the accumulation of a body of knowledge on how prophecies are communicated should facilitate the implementation of programs aimed at training teachers to bring about substantial improvements in their students' performances without making formal changes in their methods of teaching. However, it appears that much additional research will be needed before such practical benefits can be derived.

Perhaps the next logical step in the current series of investigations on the self-fulfilling prophecy phenomenon should be an extensive, indepth, multidimensional study with the purpose of simultaneously examining and assessing the relative inputs and effects of the several most probable modes of bias communication. In view of the methodological problems encountered in the present study, however, it is recommended that such a study be conducted in a more stable and receptive educational environment, such as an elementary or secondary school should provide.

APPENDIX A

DESCRIPTION OF TEACHERS AND STUDENTS

All teachers and students who participated in this study were Negroes.

Two of the teachers were women; two were men. The women teachers were in their mid-forties, both were college graduates, and both taught elementary school classes on a regular basis while serving as ABE teachers during the evening program. The men teachers were in their late thirties, both were college graduates, and both taught elementary school classes on a regular basis while service as ABE teachers during the evening program.

The twenty-three ABE students on whom usable data were obtained ranged in age from 26 to 67, with median age about 42.6. The median age was approximated because some of the women preferred not to disclose their exact ages and a few of the other students (men and women alike) did not know their birth dates. Of the twenty-three subjects, six were male and seventeen were female. Highest grade in regular school attended by any one of these ABE participants was the tenth grade; lowest grade attended was the second grade. On the basis of pretest WRAT reading performances, the highest grade equivalency for these students was 9.3, the lowest grade equivalency was 1.3, and the average grade equivalency for the combined group was 4.5. Informal talks with these participants revealed a variety of reasons for attending the ABE program, ranging from a desire to obtain a promotion on the job to simply having something to do with their free time.

APPENDIX B

MEMORANDUM SENT TO TEACHERS

THE FLORIDA STATE UNIVERSITY
Tallahassee 32306

Adult and Continuing Education — College of Education
Graduate Instruction-Research-
Extension

March 6, 1970

MEMORANDUM

To: Reading Group Teachers

From: Millard L. Blakey, Research Associate

Subj: Overview of Current Research Project

A phenomenon known as "late blooming" among students--or the tendency of some students to experience sudden spurts forward in their academic progress--is currently enjoying widespread interest and attention among educational researchers in this country. The Florida State University, with the help of the U.S. Office of Education, is participating in this series of ongoing efforts to explore the nature of this phenomenon. More specifically, the study now being conducted by FSU is concerned with the verbal behaviors of potential late blooming students at the elementary school (ABE) level.

Previous studies in this series indicate that there is a definite relationship between an elementary student's acquisition of certain words or patterns of words and his tendency toward late blooming or "academic spurting." However, since mere acquisition does not necessarily guarantee mastery of the proper uses of such words and word combinations, it has been noted that this relationship, when it is used as the basis for predicting spurts in academic progress, does not hold in all cases. About three out of every four such predictions made thus far have proved to be true. The purpose of the present study is to try and improve the predictive validity of the technique through detailed analyses of potential late blooming students' usages of key words and word combinations in their dialogues with their teachers.

As you know, an achievement test was recently administered to a large number of ABE students at your school. An analysis of the results of this test reveals that several

students are able to recognize and pronounce the key predictor words at their respective grade levels and that they will therefore most likely enjoy rapid academic progress over the next few weeks or months. Four of these potential "academic spurters," whose names are listed below, have been assigned to your Reading Group. Their verbal behaviors will be compared with those of the other students in your group.

Your cooperation in this research project is greatly appreciated by all concerned. To avoid the possibility of distorting or biasing the results of the study, we ask that you please treat this memorandum confidentially and that you refrain from any discussion of the nature or purpose of the study with students, other teachers, or anyone else for the duration of the project. When the study has been completed, you will be advised of the results. Thank you very much.

APPENDIX C

RELIABILITY COMPUTATION

Category	Flanders A	Observer B	% A	% B	% Diff.	$\frac{(\text{Ave.}\%)^2}{100}$
1	0	0	0.0	0.0	0.0	.000
2	8	7	2.9	2.6	0.3	.076
3	35	31	12.7	11.7	1.0	1.488
4	21	29	7.6	10.8	3.2	0.846
5	32	34	11.6	12.8	1.2	1.488
6	27	19	9.8	7.2	2.6	.722
7	12	10	4.3	3.8	0.5	.164
8	19	13	6.9	4.9	2.0	.292
9	117	113	42.4	42.6	0.2	18.062
10	5	10	1.8	3.8	2.0	.078
Totals	276	265	100.0	100.2	13.0	23.216

Computation of Scott's Reliability Coefficient

$\pi = \frac{P_o - P_e}{100 - P_e}$ (The amount that two observers exceed chance agreement, divided by that amount perfect agreement exceeds chance.)

(1) $\pi = \frac{(100-13) - 23.2}{100-23.2}$ (2) $\pi = \frac{87-23.2}{76.8}$

(3) $\pi = \frac{63.8}{76.8}$ (4) $\pi = .831$

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